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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of	)	
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
	)	CC Docket No. 97-160
Forward-looking Mechanism for High Cost Support for Non-Rural LECs	)	

AFFIDAVIT OF FRANCIS J. MURPHY
IN SUPPORT OF
GTE'S PETITION FOR RECONSIDERATION
OF THE FIFTH REPORT AND ORDER

FRANCIS J. MURPHY, being duly sworn, deposes and says as follows:

INTRODUCTION AND SUMMARY

1. I am the founder and president of Network Engineering Consultants, Inc. ("NECI"). NECI is a consulting group that specializes in financial analysis, service cost analysis and engineering cost analysis of the telecommunications industry. We also provide telecommunications engineering services, and expert testimony and witness support for clients in both federal and state proceedings.

2. I have worked in the telecommunications industry for more than 28 years. In my present position, I have analyzed and evaluated telecommunications costing methodologies

and models in universal service fund and unbundled network element proceedings. I have authored reports and provided expert testimony and witness support regarding the HAI Model, non-recurring cost studies, collocation cost studies and avoided cost studies on behalf of my clients in approximately one dozen jurisdictions. My firm has provided expert testimony and witness support for the same models and studies in approximately twenty jurisdictions.

3. Prior to founding NECI, I was employed by NYNEX Corporation (now Bell Atlantic). During my tenure at NYNEX, I held a variety of positions. In my last NYNEX position, I was a staff director responsible for the costing of interstate services, including both recurring and non-recurring studies for existing and new services. I also had responsibility for calculating the exogenous costs associated with various Price Cap filings. Prior to that, I was responsible for calculating and reporting interstate rate of return results to the FCC. Earlier in my career, I was a network operations manager. My responsibilities in that position included network operations and budget responsibilities that included central office operations, interoffice facility operations, customer premises installation and maintenance operations, test center operations and project management.

4. During the past two years, I have analyzed the various versions of the HAI Model (previously called the Hatfield Model), the AT&T Collocation Model, the Bench Mark Cost Proxy Model ("BCPM") and the AT&T Non-recurring Cost Model. More recently I have attempted to analyze the Hybrid Cost Proxy Model ("HCPM") filed by the staff of the FCC's

Common Carrier Bureau. In general, analysis of these models has followed a series of steps that are detailed below.

5. A major focus of my analysis was to determine whether the model platform in question adhered to the engineering standards followed in the industry today. I reviewed the model to determine if the maximum copper loop length complied with Carrier Serving Area (CSA) standards. I investigated the type of facilities placed to ensure that they were forward-looking. I reviewed optimization algorithms to ensure that the correct technology types and quantities of facilities were chosen. Switching algorithms and assumptions were reviewed to determine if the models adhered to the industry standards for line-to-trunk ratio, line concentration ratios, modularity, etc. I examined the associated signaling network to determine if it was consistent with signaling design standards being used in the industry today. Similarly, I examined the interoffice network to ensure it contained adequate capacity to carry the traffic that would be traveling over it.

6. Another component of my analysis was determining whether the mechanics of the models were correct. I traced algorithms within and between the various modules contained in each model to determine if the algorithms reflected the assumptions asserted by model sponsors. I conducted tests to ensure that data was passed correctly from module to module, and processed properly by each model.

7. Default input values were another source of concern to me. I reviewed the default values and

the corresponding support proffered by model sponsors to determine if they were based upon empirical data and sound engineering principles. I sought out and reviewed from model sponsors the empirical data that supported the proposed input values. I took my analysis a step further and compared proposed input values with actual company values and industry values.

8. I performed analyses to ensure that input values were incorporated correctly into the algorithms in the models. I ran sensitivity analyses to determine if fluctuations in input values produced expected output results, (i.e., whether an increase in trunk port values produced a corresponding increase in switch investment levels.)

9. For the models in question, I conducted tests to validate the reasonableness of the output produced. I verified that the average drop lengths produced by the models were consistent with drop length estimates produced by the individual companies and by the industry (such as the drop length study contained in the Bellcore Notes on the LEC Networks), I determined if the size of the interoffice trunk network produced could handle the corresponding traffic produced by the model, I compared the loop lengths produced by the models to the actual data for the company in question, and I compared the number and size of the switches in the models with the switching networks in place to determine if the models placed the correct number and type (host, remote or stand-alone) of switches. I also examined the output produced by the models to determine if it complied with directives and mandates set forth by the FCC.

10. During my validation process, I paid particular attention to the ten criteria set forth by the FCC in the Universal Service Order, since the ten criteria clearly outline the FCC's expectations with regard to forward-looking cost mechanisms. In addition, I reviewed the various Report and Orders, Notices of Proposed Rulemaking and Public Notices issued by the FCC in this docket.

11. On November 18, 1998, the FCC's Fifth Report and Order ("Order") in CC Docket Nos. 96-45 and 97-160, FCC 98-279, was published in the Federal Register. The Order was initially released on October 28, 1998. In the Order, the FCC adopted a so called "synthesized" platform for the cost proxy model ("FCC Model" or "Model") that will be used to estimate non-rural carriers' forward-looking costs to provide universal service. As of October 28, 1998, neither I nor anyone at GTE that I am aware of had seen a complete version of the FCC's new Model. Thus, after the FCC announced the proposed platform for the first time on October 28, 1998 and released it on their web site on November 18 and again on December 7, 1998, I attempted to perform the same types of analyses that I had undertaken earlier in this docket to evaluate the other cost proxy models proffered in this proceeding.[1] For purposes of this affidavit, I evaluated the December 7, 1998 version of the Model. On December 17, 1998, the FCC posted an updated version of the Model on the FCC web site. Due to the late release of this most

[1]On July 18, 1997 the Commission issued a Further Notice of Proposed Rulemaking (CC Docket No. 96-45 and 97-160) to solicit comments of interested parties regarding the HAI and BCPM Cost Proxy Models. I participated in these comment cycles on behalf of GTE.

recent version (December 17, 1998 at 1:21 p.m)., I was not able to evaluate it for purposes of this affidavit.

12. I obtained a "version" of the new Model from the FCC's web site. I wanted to determine if, as required by the Universal Service Order, the Model could produce reasonable cost estimates consistent with the forward-looking Total Service Long-Run Incremental Cost (TSLRIC) guidelines established by the FCC, if it adhered to accepted engineering standards, and if it produced an efficient, functioning network that could serve all customers. To that end, I set out to analyze the FCC Model's assumptions to understand how those assumptions were captured in the Model's new algorithms, to understand how each module functioned, and to understand how data and information flowed from one module to another.

13. I was not able to complete my analysis for several reasons. First, the Model did not contain all of the data that is needed to actually run it and obtain results. For instance, the geocode data is not available for my evaluation and review. Second, the documentation explaining the Model's underlying assumptions and algorithms is not complete. Third, all of the modules, as modified by the Order, are not available for review, and it is unclear to me which versions of certain modules are now considered the latest within the context of the Order. Fourth, the Model appears to produce illogical results that cannot be explained. Finally, the Model is still changing and, therefore, is incomplete. It appears that the Commission is making modifications to the modules on almost a daily basis,

making it nearly impossible to determine which version of the modules should be analyzed. The remainder of this affidavit gives a thorough explanation of the difficulties I encountered when trying to run and evaluate the Model.

14. For the reasons detailed below, I believe that the new FCC Model should not be adopted at this time because it cannot be (and has not been) properly evaluated or validated. The limited analysis that I was able to perform indicates that there are serious flaws in the current version(s) of the Model.

THE MODEL CANNOT BE FULLY EVALUATED OR VALIDATED

15. In its Order, the Commission adopted a model platform that purportedly, "combines the best elements from each of the three models currently in the record."[2] By doing this, the FCC has assembled a new model that must be analyzed. This is due to the fact that the Model consists of components from HAI, BCPM and staff's HCPM, even though those components were never designed to work together. To date, a working version of this new Model does not exist. Even worse, the parts (modules) that the FCC has ordered to be included in the Model are still undergoing changes in order to make the Model comply with what the Order says it should do. The FCC released a version of the Model on November 18, 1998 and yet another version on December 7, 1998 on its web site. As a

[2] See Order at Paragraph 4.

result, I had to abandon my analysis of the earlier version and begin an analysis of the December 7, 1998 version. As stated previously, there was insufficient time allowed for an evaluation of the December 17,1998 release for purposes of this affidavit.

16. The FCC Model is a combination of different modules from different models that no party (nor the Commission) had specifically proposed prior to the Order. The Model relies on modified expense and switching modules from the HAI Model, and the HCPM customer location and loop design modules, and an entirely new interface module. This combination of four different modules from different models, plus the addition of a brand-new interface module, makes it impossible for the user to run the Model as mandated in the Order, because there is no single location where these modules come together. The HCPM and interface modules, along with some of the inputs, are available on the FCC web site (although, as noted above, these modules are changing constantly).

17. The switching and expense modules are not available on the FCC web site. It is up to the user to make the determination as to which versions of these modules should be used and where they can be obtained. Since this information was not available on the FCC web site, in order to complete my analysis of the Model, I had to obtain the switch and expense modules from GTE (See the Affidavit of Subhendu Roy on behalf of GTE). The versions of the expense and switch modules detailed in Mr. Roy's affidavit are what I used to perform my evaluation, the results of which are detailed in the remainder of this affidavit.

18. The fact that the piece parts of the Model are not controlled by a single sponsor results in the user having to, in essence, guess which version of which module is currently under consideration by the FCC. Furthermore, the Model designed by the FCC requires that a working version of the HAI Model be installed on the same computer that is used to run the other modules of the Model.

19. A cost model is significantly more than the sum of its modules. By combining modules from different models, and indeed adding a brand-new interface module, the FCC has created a situation potentially prone to errors, redundancies, omissions and inappropriate cost calculations. This new Model's structure requires sophisticated software not only to control the calculations and flow of information between and among the modules, but also to provide checks and balances to ensure that these modules (designed to work independently or within a totally different model) are functioning properly together. The interface module developed by the FCC staff allegedly has the capability to perform these functions. Without the final working modules (i.e., the final versions of all the modules that the FCC has adopted), and actual customer location input data, it is impossible for me to determine if the interface module correctly combines the different modules.

20. The FCC's Model purports to design its network based on customer location data. The accuracy of its design therefore hinges on the accuracy of customer location data. GTE

has not been able to obtain access to the "default data source for customer locations" [3] required to run the FCC Model and obtain results. Without this data, GTE is unable to evaluate the Model platform because no company specific results can be produced. Presently, the only data provided by the FCC for GTE's review and analysis is the fictitious data for Maryland contained in the files of the Model as released by the FCC. Fictitious data for the state of Maryland (a non-GTE territory) is not sufficient for purposes of evaluating and validating the FCC's Model for GTE's territories. The Affidavit of Christian Dippon, filed on behalf of GTE, discusses this issue in further detail.

21. In addition, the FCC has failed to define the algorithm for placing customer location surrogates.[4] This algorithm, which is a platform item according to the FCC's definition,[5] is needed to place non-geocoded customers along roads. The currently available FCC Model contains only algorithms to be applied to geocoded data. Actual source data for customer location will consist of both geocoded data and customer locations that must be placed along roads. Absent the actual non-geocoded data and the associated algorithm, the customer location portion of the Model platform is incomplete and cannot be analyzed to determine if the Model properly places customers along roads.

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[3] See Order at A-3, Paragraph 8.

[4] See Order at Paragraph 34.

[5] Further Notice of Proposed Rulemaking, Before the Federal Communications Commission, CC Docket Nos. 96-45 and 97-160, Released July 18, 1997, Paragraph 17.

22. The Model cannot even be evaluated using the fictitious data for Maryland by one of the companies that does operate in Maryland. Bell Atlantic has stated that it was unable to meaningfully evaluate the FCC Model, and recommended that the Commission not include its proposed modules in the proxy model platform without releasing input data for the rest of the country in order to facilitate a comparative analysis.[6] Bell Atlantic made this request because it found unexplainable variations at the wire center level, and because the Model produced outputs that were contrary to the results one would expect.[7] Earlier in this docket, the FCC excluded the Telecom Economic Cost Model ("TECM") from further consideration "because the proponents have never provided nationwide estimates of universal support using that model."[8]

23. The FCC has deferred the choice of a customer location database to the inputs phase of this proceeding. This approach is not reasonable for several reasons. First, the geocode data, as utilized by the FCC Model, is in fact a preprocessing step and not a user-adjustable input value. Second, the Model cannot design a viable network if the location of customers is unknown. The starting point of network design for the loop portion of the model is the location of the customers. If GTE is not afforded the opportunity to review the data which drives the construction of the network, it follows that GTE will not be able

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[6]See Comments of Bell Atlantic on Model Platform, Before the Federal Communications Commission, Docket Nos. 96-45 and 97-160, August 28, 1998, Pages 1-2.

[7]Id, Pages 5-8.

[8]See Further Notice of Proposed Rulemaking, Before the Federal Communications Commission, CC Docket Nos. 96-45 and 97-160, Released July 18, 1997, Paragraph 11.

to validate the network that is constructed. Therefore, the unavailability of customer location data renders the Model inoperative and GTE incapable of evaluating the platform as put forth by the FCC.

24. The algorithms and engineering assumptions dictate how the Model platform designs and sizes the components of the network. The algorithms are also used to define the cost calculations that produce UNE and USF results. As a result, the standards and algorithms included in the Model should be well documented to facilitate the user's evaluation and validation of the standards being incorporated in the Model. This is not the case with the FCC Model. The FCC has not provided the documentation necessary to understand the algorithms and engineering assumptions that are the underpinnings of the Model, thus making it difficult for the user to understand how the Model should function. When documentation has been provided, it does not appear to be correct. For instance, the default input values found in the Model documentation differ from the input values actually contained in the FCC Model files.

25. The FCC adopted the HAI 5.0 switching and interoffice facilities module with modifications,[9] but this modified module from the HAI Model has not been made available to interested parties. Consequently, GTE is not able to evaluate the modifications proposed by the FCC. Without these modifications, it is not possible to

[9]See Order at Paragraph 75.

evaluate the switching and interoffice module as proposed by the FCC.

26. The FCC staff has proposed preliminary changes to some of the inputs that will be used in the switching module that are inconsistent with the algorithms contained in the switching module. For instance, the FCC staff has made a significant effort to improve switch investment inputs by using LEC specific switch purchases from publicly available data sources.[10] However, the staff is proposing switch investment inputs for large switches that include power investment, while at the same time it is proposing investment inputs for small switches that do not include power investment. The switching module of the FCC Model was not designed to process this two pronged approach to power investment calculation.

27. The switching module contains algorithms that use the trunk port input value (among others) to adjust end office investment and to build tandem investment. For the end office switch, the inputs the FCC is contemplating are inclusive of the trunk port investments. The proposed inputs assume an appropriate relationship between lines and trunks. Therefore, the proposed end office switch investment input negates the need to adjust end office trunk port quantities. As a result, the Model platform should be modified to recognize the fact that the end office input values already recognize the appropriate trunk quantities and trunk port investments. Without this modification, the

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[10]See "Estimating the Cost of Switching and Cables Based on Publicly Available Data," The National Regulatory Institute, David Gabel, Ph.D, Scott Kennedy, April 1998.

Model will provide unintended and erroneous results.

28. Changes in the Model platform will also be required for the Model to produce accurate tandem investment values that can be fully evaluated. Tandem investment is developed using a different methodology than the one used to develop end office investment. First, the Model assumes a common equipment investment value for each tandem office. It then takes the number of tandem trunk ports produced by the Model and multiplies them by the trunk port input value. It adds this value to the common equipment investment to develop the total tandem investment. This methodology is faulty because the Model produces illogical line to trunk ratios, and too few trunks. (A complete explanation of the Model's failure to produce sufficient trunks is contained in the latter part of this affidavit.)

29. In order for the Model to produce meaningful tandem investment results, platform changes must be made that enable the Model to produce the correct number of trunks. Presently, the number of trunks produced by the Model can be increased by changing "% traffic in the busy hour" variable. An increase in this variable results in the production of additional trunks in a predictable fashion. A problem arises, however, because in order to produce sufficient trunks, that variable must be set at illogical levels. (For instance, using the data provided on the FCC web site for Chesapeake and Potomac (C&P) in Maryland, it is necessary to assume that in excess of 40% of all traffic will occur during the busy hour. This is not a logical assumption. Therefore, in order for the Model to be fully

evaluated, changes should be made to the Model platform that will enable the Model to produce appropriate trunk levels and consequently, appropriate tandem investment.

30. The Commission concluded "that the platform for the federal mechanism should consist of HAI's algorithm for calculating expenses and GSF costs, as modified to provide some additional flexibility in calculating expenses offered by BCPM."[11] It is my understanding that two versions of the expense module, both of which purportedly contain the ordered flexibility to input expenses on a per line basis, have been filed by MCI in ex parte submissions only. The Order does not specify which, if either, of the two versions has been adopted, nor where the user can obtain the version that has been adopted. Similarly, it is unclear which version of the HAI Model is to be used. The Order cites version 5.0, yet the FCC Model documentation refers to version 5.0a. Moreover, as is the case with the switching module, the FCC has ordered the use of an expense module that has never been part of a proposed or adopted version of the HAI Model in any jurisdiction in which GTE has been involved.

31. The HCPM module's source code is written in Turbo Pascal programming language and compiled in various .exe files. Because the Model's documentation is incomplete, I am unable to decipher and track the programming code in the new Model to see that it correctly incorporates the purported assumptions contained in the Model. The source

[11] See Order at Paragraph 81.

code for individual files can be interpreted, but to understand the interaction between the files would require reverse compiling of the .exe files. As a result, the user cannot determine, without some very sophisticated programming techniques, how the logic in the Model flows within and between files. The inability to trace the logic flows through the various files contained in the Model makes it unreasonably difficult to determine if the logic flows are consistent and reasonable. If the logic flows are not consistent and reasonable, the Model will produce flawed results.

LIMITED ANALYSIS REVEALED THE FCC MODEL <u>IS NOT WORKING CORRECTLY</u>

32. Because of the problems and missing data described above, I have been able to review only a small portion of the new Model. Yet, even my limited analysis of the FCC Model revealed numerous inconsistencies and problems with its logic. The Model is not consistent in its placement of fiber facilities, decreases costs to account for structure sharing twice, and produces identical investment for different cost elements. Inconsistencies such as these render the Model incapable of producing meaningful costs.

33. The Model arbitrarily designates feeder placement investment as copper or fiber using fixed percentages that are hard-coded in the Model. This causes the Model to produce the same values for the fiber feeder placement investment and copper feeder placement investment (See HCPM Feedgrid.csv and HCPM/HAI Feeder Output by Cluster Workfile). It is not logical for a Model to produce identical investment values for copper

and fiber feeder placement, because the material and labor to engineer, place and splice copper versus fiber cable are markedly different.

34. The use of these arbitrary percentages also causes the Model to produce fiber feeder placement costs in clusters and entire wire centers where there is no fiber cable (See HCPM Feedgrid.csv and HCPM/HAI Feeder Output by Cluster Workfile). Obviously if the Model assigns fiber feeder placement costs to a wire center, then it should also assign corresponding costs for fiber cable. The placement investment represents the cost to place fiber cable. If there is no cable investment in the Model, then there should not be any corresponding investment to place that cable.

35. The FCC Model improperly applies a factor to account for structure sharing twice, rather than once. Structure sharing factors, which reduce costs to account for savings realized by companies when they share underground, buried or aerial structure (or carrying plant), are used in the Model's HCPM module. The results of the HCPM module are then passed to the expense module. The expense module then applies a second set of sharing factors, thereby again reducing the costs produced by the Model for structure sharing cost savings. This will lead to a significant understatement of the costs produced by the Model.

36. The format of the inputs required to run the HCPM loop design module in some cases differs from the format required in other modules of the FCC Model. For instance, pole

material, labor and spacing inputs are not separate inputs in the HCPM. They are combined and included as an aerial structure placement cost per foot. In the switching module of the FCC Model, these values are separate inputs. As a result, it is necessary for the user to map pole structure inputs between the HCPM module and the switching module.

37. The various sizes of the Digital Loop Carrier (DLC) systems (2016-, 672-, 96-, and 24-lines) are hard coded into the HCPM module software. The DLC equipment offered by vendors today offers additional modularity increments. For example, one DLC configuration used by GTE contains nine modularity increments. As a result, GTE is unable to alter the DLC configuration contained in the Model to reflect the realities of its operating territories. If the Model is not capable of modeling the DLC modularity increments contained in GTE's network, then it will not be able to produce accurate costs for GTE's operating territories.

38. In the loop design module, an annual carrying charge factor is inappropriately applied to SAI investment. The output produced by the loop design module should be an investment value, not a cost value. Yet the module applies the Feeder Distribution Interface (FDI) carrying charge factor to the SAI investment to produce an SAI cost. This figure is then passed through to the expense module where carrying charge factors are applied for the second time. As a result, there is a significant understatement in the SAI costs produced in the Model.

39. The Model contains an error in the switching module which causes the investment for SONET OC3 rings and associated host/remote SONET Add/Drop Multiplexers (ADMs) to be overstated. The ">OC3 determination" algorithm is used in the Model to determine if more than one OC3 is required. Rather than basing this calculation on the number of DS0 trunks required, the calculation is based on the number of DS1 trunk groups. As a result, the denominator of the equation is understated, causing the algorithm to produce a higher OC3 requirement than is actually required.

40. There are similar errors in the Model that cause the total tandem Digital Cross Connect System (DCS) investment, total OS tandem ADM investment and total Operator Services (OS) tandem DCS investments to be overstated. The "total tandem DS3s" and "total operator DS3s" calculations incorrectly include the number of trunk groups per DS3 rather than the number of trunks per DS3. As a result, the denominators of these equations are understated which causes the Model to overstate the DCS investment that is actually required.

41. There is no input value for Digital Loop Carrier fill in the Model. Since network design and equipment costs are dependant upon a level of fill, and none is provided as an input or in the source code, it follows that the Model is building to a 100% fill of the DLC. This is not a reasonable assumption because it would require an unnecessary, timely and costly labor and material outlay on the part of the ILEC to serve a single customer request for relocation, installation, maintenance or increased bandwidth services. DLC is

typically engineered to a theoretical fill factor that enables sufficient capacity for growth, maintenance, administration and rearrangement activities. The fill factor also provides a buffer that is required for the construction and reinforcement of facilities.

LIMITED ANALYSIS SHOWS THAT THE MODEL DOES NOT COMPLY WITH THE DIRECTIVES OF THE FCC IN THE FIFTH REPORT AND ORDER AND OTHER ORDERS

42. In addition to the problems described above, the FCC's new Model does not do what the Fifth Report and Order says it should. In other words, the Model does not comply with the Order. It also fails to comply with many of the FCC's ten criteria for cost models set forth in the Universal Service Order. Finally, it does not meet some of the directives set forth in the Second Recommended Decision of the Joint Board and the Telecommunications Act of 1996 .

43. Paragraph 54 of the Fifth Report and Order mandates that, "a model will most fully comply with the Universal Service Order's criteria if it designs a network that reflects as accurately as possible the available data on customer locations, adheres to sound engineering and forward-looking, cost minimizing principles, and does not impede the provision of advanced services." Criterion One of the ten criteria also mandates that, "the loop design incorporated into a forward-looking cost study or model should not impede the provision of advanced services."[12] In addition, the 1996 Telecommunications Act

[12] See Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Report and Order, FCC 97-157, Released May 8, 1997 at Paragraph 250.

requires that, "the Commission and each state commission with regulatory jurisdiction over telecommunications service shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans."[13] The Model, in its current form, does not meet these directives because it relies on a copper loop length of 18,000 feet - a distance that will impede the provision of advanced services.

44. In the Fifth Report and Order, the FCC adopted an 18,000 foot copper loop length as part of the Model platform. The Order stated, "We conclude that the federal mechanism should assume a maximum copper loop length of 18,000 feet. The record supports the finding that a platform that uses 18,000 foot copper loops lengths will support at appropriate levels the services eligible for universal service support."[14] This choice of an 18,000 foot loop length as an engineering standard for the platform is a major shortcoming of the Model, because in choosing an 18,000 foot rule, the FCC has ignored the Carrier Serving Area (CSA) design standard. This CSA standard represents the currently accepted transmission design practices.

45. The CSA standard limits the use of copper loops to 12,000 feet.[15] The Bellcore Notes on the LEC Networks states the following regarding the CSA design standard:

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[13]See Telecommunications Act of 1996, SEC 706.

[14]See Order at Paragraph 70.

[15]See Bellcore Notes on the Networks, Issue 3, December 1997, SR 2275, page 12-17 and AT&T Outside Plant Engineering Handbook, August 1994, Section 13-1.

> "The evolution to a network that can readily provide digital services via loop facilities led to the Carrier Serving Area (CSA) concept. A CSA is an area that is or may be served by DLC. DLC may be either stand-alone (UDLC) or integrated into the end office switch (IDLC). All loops within a CSA are nonloaded. They are capable of providing on a nondesigned-basis conventional, voice-grade message service; digital data service up to 64 Kbps; Digital Subscriber Lines (DSLs) for ISDN; and most locally switched, 2-wire, voice-grade special services. Ordinary channels (pair-gain pairs) on the DLC system have a loss of 2dB or less, thus allowing for attenuation in the physical cable within the CSA. Loop length in the CSA is limited by attenuation, not by dc resistance. Bridged-tap lengths are controlled to preserve capability for high-speed, digital operation. <u>CSA design is now used for most loop growth.</u>"[16]

This standard has evolved over time to ensure that the telephone network could readily provide digital services via loop facilities. The standard was implemented in order to produce a local loop that could "accommodate a wide range of transmission applications including voice, data, video, sensor control and many others."[17] The standard was also put in place in order to avoid expensive reconditioning of the cable plant that would have been necessary in order to provide high speed services.[18]

46. Recent documentation released by industry manufacturers recognizes that LECs adhere to the CSA design standard in order to construct networks that can accommodate advanced digital services:

> "Today the CSA design rules ensure that quality 2-wire voice transmission and the capability to support advanced digital services, including repeaterless digital data services (DDS), ISDN basic rate transmission (2B+D), high-bit rate digital

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[16] <u>See Bellcore Notes on the Networks</u>, Issue 3, December 1997, SR-2275, page 7-71(emphasis added).

[17] <u>See AT&T Outside Plant Engineering Handbook</u>, August 1994, Section 13-1.

[18] <u>Id</u>.

subscriber line (HDSL), and asymmetrical digital subscriber line (ADSL)."[19]

47. The CSA design standard is supported by the major telecommunications providers in the industry today. GTE, Sprint, Bell South, US West, Southwestern Bell, Bell Atlantic and the Rural Utilities Services have all expressed their support of the CSA standard[20], and have unanimously opposed the 18,000 foot loop standard.

48. The Model's failure to adhere to the CSA design standard produces a theoretical loop network that inhibits the provision of digital services and advanced telecommunications services. If such a network were to actually be built, the provisioning of customer requests for advanced services would require labor intensive and expensive loop conditioning for many requests. These activities would be needed to condition the loop to provide an acceptable quality of the signal transmission. This high cost, highly labor intensive loop qualification testing process is not realistic in the competitive telecommunications environment envisioned by Congress in the Telecommunications Act of 1996. Dr. Stagg Newman, when speaking before the FCC at a Broadband Forum, confirmed these higher costs: "[I]t turns out once you get out about 10,000 feet from the central office, it costs three times as much to provide ISDN." [21] These higher costs

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[19]DSC Litespan Practice, OSP 363-205-010, Issue 6, July 1997, Page 42.

[20]See Comments and Reply Comments filed by the various parties in CC Dockets 96-45 and 97-160, Before the Federal Communications Commission, in response to the Further Notice of Proposed Rulemaking, Released July 18, 1997.

[21]Hearing transcript from the appearance of Dr. Stagg Newman, Before the FCC at the Broadband Forum, January 23, 1997, Page 15. (See fcc.gov/report/970123.txt)

referred to by Dr. Newman are incurred by ILECs today in areas where the CSA design standard was not in place when the embedded network was developed. Like these areas in the embedded network in place today, the network constructed in the FCC Model would require special conditioning, and therefore higher costs, to accommodate advanced services and thus impede the development of advanced services (if they could be accommodated at all).

49. By designing a network that will require significant loop conditioning costs, the FCC is disregarding the fact that ILECs will provide USF and UNE services over the same network. In its First Report and Order, the FCC mandated that ILECs must condition loops for data transmission if technically feasible.[22] But, the cost of such conditioning would be passed on to the requesting carrier.[23] Therefore, it is in the interest of both ILECs and their competitors that the forward-looking network that will be used to provide both UNE and USF service, be constructed in a manner that will minimize conditioning costs. The Model adopted by the FCC does not minimize these costs.

50. The use of 18,000 foot copper loop lengths does not comply with the FCC's definition of a loop. The First Report and Order, in CC Docket Nos. 96-98 and 95-185, defined the loop as "a transmission facility between a distribution frame, or its equivalent, in an

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[22] See Local Competition Provisions in the Telecommunications Act of 1996 and Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers., First Report and Order, CC Docket Nos. 96-98 and 95-185, FCC 96-325 , released August 8, 1996, Paragraph 382.

[23] Id.

incumbent LEC central office, and the network interface device at the customer premises. This definition, includes for example, two-wire and four-wire loops that are conditioned to transmit the digital signals needed to provide services such as ISDN, ADSL, HDSL and DS-1 level signals." [24] The FCC defined ADSL service as a transmission path that facilitates a "6 MBPS digital signal upstream while simultaneously carrying an analog voice signal."[25] Since 18,000 foot loops contained in the FCC Model can accommodate neither 6 MBPS digital signals nor HDSL (both of which require adherence to the CSA standard)[26] the FCC has, in essence, adopted a Model that does not comply with its own directives of what constitutes a loop in a competitive environment.

51. The only basis offered for the adoption of the 18,000 foot standard (e.g., that it "will support at appropriate quality levels the services eligible for universal service support")[27] is also inconsistent with TELRIC/TSLRIC cost principles. TELRIC/TSLRIC principles require that the total of all services/elements be studied. This insures that all economies of scale are captured and that the service or element costed out (e.g., the cost object, in this case is USF POTS lines) share these economies. For example, special access, HDSL and ADSL lines and their associated network facilities and equipment are included in a

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[24]Id., Paragraph 380.

[25]Id.

[26]See "Economics and Technology of Broadband Deployment," Prepared by HAI Consulting Inc. on behalf of The Association of Local Telecommunications Services, September 25, 1998, Appendix A, Page 19, www.alts.org.

[27]See Order at Paragraph 70.

TELRIC/TSLRIC study to the extent they contribute to economies of scale. The consideration of these lines generally drives the unit costs of the loops in a UNE study and POTS services in a USF study down, primarily because structure costs, which are more distance sensitive than the fiber or copper pairs they support, are spread over more lines. Since TELRIC/TSLRIC requires that all services provided over the network must be accounted for, the network under study, and the underlying design assumptions, must be capable of supporting all services. **After** the network and investments required have been identified and designed to support **total services**, it is reasonable in a USF study, to develop unit costs for the subset of services that are the cost object of the study, in this case USF POTS services.

52. However, it is inconsistent with TELRIC/TSLRIC principles to design a network with limited design criteria that preclude the use of elements that contribute to the achievement of economies of scale. This inconsistency results in a failure to recognize costs that are legitimately incurred (in this case for consistent, ubiquitous CSA loop standards - since any loop can be unbundled or utilized at any time to provide any service) in achieving overall scale economies. Therefore, the basis upon which the FCC relied in reaching the conclusion that maximum copper loop length should be extended as far as 18,000 feet is inconsistent with the cost methodology they have ordered.[28]

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[28]See Order at Paragraph 70.

53. The FCC reasoned that using 18,000 foot copper loops, "will support at appropriate quality levels the services eligible for universal service support."[29] It also reasoned that the 12,000 foot "design standard seems to exceed service quality standards for universal service."[30] The failure and inconsistency of this logic becomes readily apparent when it is applied to any one of the non-loop portions of the network and Model. For example, the application of this logic to the switch obviates the need for current generation digital switching since the previous generation Stored Program Control analog, or even electromechanical switches, are capable of providing supported services. Similarly the transport portion of the network need not be based on current generation SONET ring architecture, since the previous generation point-to-point fiber systems and even T-1 on copper are capable of providing the supported services at lower costs. Finally, the current generation SS7 signaling system that is contemplated by all of the proposed models is not necessary to provide the supported services since the previous generation in-band multi-frequency signaling arrangement is capable of providing the supported services at considerably less cost.

54. Paragraph 54 of the Fifth Report, and Criterion One, are further violated by the Model's implementation of the copper_gauge_crossover input. This is due to the fact that the Model violates the Resistance Design rules regarding cable gauge selection. Since this

[29]Id.

[30]Id.

input factor is applied independently in the software modules that select feeder technology and determine distribution cable gauge, it is possible for the Model to design an all copper loop that consists of 24 gauge feeder cable and 26 gauge distribution cable. In doing this, the Model places course gauge cable closer to the central office and fine gauge cable closer to the customer. This is in violation of the Resistance Design methodology which specifies that the finer gauge cable is always placed closer to the central office in two-gauge designs.

55. In Paragraph 61 of the Fifth Report and Order, the Commission concludes "that the outside plant module should be able to perform optimization routines through the use of sound network engineering design to use the most cost-effective forward-looking technology under a variety of circumstances." Criterion One of the ten criteria also mandates that, "the technology assumed in the cost study must be the least-cost, most efficient, and reasonable technology for providing supported services that is currently being deployed."[31] Yet, the cost-effective forward-looking technology and design standards cannot be the basis for the FCC's outside plant optimization routines because the Model uses copper-based T-1 DLC technology. This is outdated technology that is expensive to provision and maintain, and it is not currently being deployed in new feeder routes.

[31] See Report and Order at Paragraph 250.

56. Copper-based T-1 DLC is not forward-looking technology. It is an outdated, 1970's technology that is no longer being placed by the major telecommunications companies in the industry today. HAI Consulting, Inc., the developer of the HAI Model, stated in a recent paper that, "DLC using copper feeder, while technically possible, is not practical for ADSL applications because of the inordinate number of wire pairs that would be required."[32] Indeed, by using copper-based T-1 DLC, the FCC Model builds a network that is obsolete from the outset. Copper-based T-1 DLC provides extremely limited bandwidth. The copper-based T-1 DLC design included in the FCC Model limits each customer to no more than 64 Kbps per line, a speed far below the advanced services being introduced into the marketplace. Mr. Don J. Wood, who has sponsored the HAI Model on behalf of AT&T and MCI in numerous jurisdictions, has stated that, "there are existing DLC systems that utilize copper wire pairs, but forward-looking DLC architecture assumes the use of fiber-optic transmission facilities."[33] Mr. James Wells, a member of the HAI Outside Plant engineering team has also stated that copper T-1 carrier is not a forward-looking technology.[34] This contention is further supported by Mr. John Lynott, AT&T's Non-Recurring Cost Model (NRCM) expert. Mr. Lynott, in another proceeding stated it would not be forward-looking to utilize T-1 on copper in the loop under any

[32] "Economics and Technology of Broadband Deployment," Prepared by HAI Consulting Inc. on behalf of The Association for Local Telecommunications Services, September 25, 1998, Footnote 87, www.alts.org.

[33] Direct Testimony of Don J. Wood, on behalf of AT&T and MCI, Before the North Carolina Public Service Commission, Docket No. P-100 Sub 133d, February 16, 1998.

[34] See Deposition James W. Wells, Before the Florida Public Service Commission, Docket No. 980696-TP, October 6, 1998, Transcript at Pages 44-45.

circumstances in a DLC environment.[35] Similarly, the Rural Utilities Service has stated that, "no one is installing new copper T1 systems in rural America today except, in a few cases, on existing plant. Traditional T1 copper-based subscriber-carrier is not a modern technology."[36] It appears that this is one of the few points on which the industry has actually reached a consensus, yet the FCC platform adopts this outdated technology contrary to that consensus.

57. In addition to not being forward-looking, the digital T-1 technology included in the FCC Model is not functionally correct from an engineering standpoint. The Model assumes "traditional T-1 service with repeaters and HDSL"[37] on 26 gauge copper cable. For traditional T-1 with repeaters, the maximum allowable T-1 carrier repeater spacing for 26-gauge air-core PIC cable typically used in aerial construction is limited to 4,000 feet.[38] However, the Model has no provisions for calculating repeater costs based on cable length. For T-1 on HDSL, repeaters referred to as "doublers" are required for cable lengths more than 12,000 feet.[39] Once again, the Model has not included the added cost

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[35]Deposition of John Lynott in the State of California before the Public Utilities Commission, Docket Nos. R. 93-04-003 and I. 93-04-002, November 19, 1997 at Page 437.

[36]Reply Comments of the Rural Utilities Service on Outside Plant Structure, Before the Federal Communications Commission, CC Docket No. 97-160, October 3, 1997, Page 3.

[37]See Hybrid Cost Proxy Model, Customer Locations and Loop Design Modules, December 4, 1998, Appendix 2, Page 37.

[38]See AT&T Practices, "T-1 Digital Line Transmission and Outside Plant Design Procedures Carrier Engineering," AT&T 855-351-101, Issue 9, July 1990.

[39]See Product Guide of Pair Gain-The CopperOptics Company, June 1997, Page 5.

of these repeaters. Nor does the Model contain any methodology for determining a crossover between traditional T-1 and T-1 on HDSL. The Model assumptions simply state the "input values for terminal costs should reflect the relevant cost of repeaters for T-1 technology."[40] Since these costs vary with cable length for each T-1 terminal placed, it is not possible to reflect the relevant cost with a single input value.

58. Copper-based T-1 technology is expensive to build and maintain. It requires the installation of regenerators, and does not have the extensive remote maintenance and administration capabilities provided with Next Generation Digital Loop Carrier (NGDLC) on fiber. The annual carrying charge factors used in the Model and the Model's selection of T-1 on copper over fiber DLC indicate that the Model does not reflect the real economic advantages of fiber DLC over T-1 on copper.

59. The HAI Model 5.0a also inappropriately includes the use of copper-based T-1 DLC. Unlike, the FCC Model however, HAI limits the use of this technology to outlier clusters only (the majority of which are in the two lowest density zones). The FCC Model applies this technology across all density zones.

60. To be forward-looking and cost-effective, the network designed by the Model must be able to accommodate at least the service demands of the existing customer base. The

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[40] See Hybrid Cost Proxy Model, Customer Locations and Loop Design Modules, December 4, 1998, Appendix 2, Page 37.

optimization routines in the FCC Model do not take into account the extra costs that will be incurred by ILECs who do not build sufficient spare capacity into their networks to serve both their existing and potential customer base. Life cycle costs of existing technology will not capture the higher costs that will be experienced in a forward-looking environment because you chose to use outdated, inefficient technology (copper-based T-1 DLC) and inefficient design criteria (building only to occupied dwellings) that only give the appearance of costing less today than more efficient technology and design standards.

61. For example, the Model documentation provides examples of the technology used to provide feeder and sub-feeder plant.[41] One scenario contemplates serving 379 lines. The engineering data provided in the HCPM documentation (see Table 16) states that the HCPM module assumes 1.242 lines per house. Thus, for the example provided, there would be 305 households being served, 74 of which have a second line. If one makes the extremely conservative assumption that only half of the second lines are associated with the use of home computers, and that 10 of these customers will request an upgrade from dial-up analog transmission to ADSL I type service (i.e., replace the second line with ADSL I), an additional twenty pairs would be needed to serve this existing customer base (i.e., one new T-1 for each ADSL I service requested, as ADSL I operates at 1.5 mbps).

[41] See "The Hybrid Cost Proxy Model Customer Location and Loop Design Modules" Documentation, August 19, 1998, Footnote 14.

62. The documentation states that 40 copper pairs would be required to serve these 379 customer lines. Based on the engineering criteria contained in the Model, a 50 pair cable would have been provided to serve this customer base. Therefore, in order to provide these 10 existing customers with the bandwidth they are requesting, it will be necessary to place new copper facilities. This is a cost intensive process that would necessitate the writing of engineering jobs, the procurement of equipment, the digging up of streets, lawns and driveways and the dispatch of technicians. These significant additional costs will be incurred to provide less than 3% (a conservative estimate) of this small existing customer database with services that are presently experiencing a very high rate of growth in the marketplace. This is precisely why HAI wrote in their ALTs paper that T-1 on copper is not practical with ADSL because it requires too many copper pairs.[42]

63. In contrast, if fiber-based DLC had been used to provide these 305 customers their telephone service, all that would be required to accommodate their request to update to ADSL I type services is to change the electronics (equipment which is completely fungible) on either end of the loop.

64. The Model also violates the directives of Paragraph 61 to use sound economic engineering design. Similarly, the Model violates the directives of Criterion Six which requires that, "The cost study or model must estimate the cost of providing all businesses

[42]See "Economics and Technology of Broadband Deployment," Prepared by HAI Consulting Inc. on behalf of The Association of Local Telecommunications Services, September 25, 1998, Footnote 87, www.alts.org.

and households within a geographic region."[43] As explained below, by constructing a network that serves only occupied dwellings, the Model is not in compliance with Criterion Six, nor with the requirement that the network be based on sound economic engineering design.

65. Census data indicates that a significant number of dwellings are vacant because households are in the process of relocating.[44] Tenants or buyers will expect to have telephone service in their new location as soon as these rental or real estate transactions are completed. Further, GTE provides express dial tone in many central offices, which provides access to 911 and the business office even if a unit is not occupied.[45] Accordingly, all housing units should be modeled in the cost study. The presence of occupants or working lines should not be the criterion.

66. Therefore, the FCC Model's use of "households" rather than "housing units" as the basis for the network it constructs violates the dictates of Paragraph 61. In addition, this approach does not adhere to industry standard loop planning and sizing guidelines. AT&T's "Interfaced Cable Guidelines," which are the accepted industry standard for

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[43] See Report and Order at Paragraph 250.

[44] Census Bureau statistics [*See United States Department of Commerce News*, CB98-58 (Apr. 21, 1998)] show that 13.7 million housing units are vacant (11.7 percent of all households). Of these, 10.4 million, or 76 percent, were classified as year-round use. A significant number of housing units are vacant pending rental turnover or real estate transfers.

[45] Express dial tone is available in California, Florida, Hawaii, Idaho, Kentucky, Oregon, and Washington.

sizing distribution cable today, dictate that distribution cables be sized for the "ultimate" pair requirements.[46] The accepted engineering standard for pair allocations is two pairs per living unit for residential areas and five pairs for distribution areas serving business customers.[47] This standard ensures that there is sufficient spare capacity available to handle growth as well as administration and maintenance functions. The network designed in the FCC Model does not produce sufficient spare capacity for growth, administration or maintenance functions. As a result, customers who reside on the network produced by the FCC Model could have lengthy delays in receiving service. This is due to the fact that when there is no spare in the network, growth jobs are required when an additional customer requires service, or when an existing customer moves into a previously unoccupied housing unit. In order to grow the network, engineering jobs must be written, equipment purchased and placed, and technicians dispatched to hook up the service. These are time consuming and costly activities not accounted for in the FCC Model.

67. In addition, the Model does not take into consideration the regulatory service standards that are imposed on the ILECs by state regulatory commissions. GTE has service standards imposed upon it in all of the states in which it operates.[48] GTE would not be

[46] See AT&T Outside Plant Engineering Handbook, August 1994, Page 3-11.

[47] Id.

[48] For instance, the Missouri Code of State Regulations (4 CSR 240-32.080) mandates that 90% of service order installations be completed within 5 days, and that 85% of customer trouble reports must be cleared within 24 hours.

able to meet the time constraints associated with provisioning and maintenance activities using the network produced by the FCC Model.

68. Paragraph 21 of the Order states that, "a telephone network must connect customer premises to a switching facility" and "ensure that adequate capacity exists in that switching facility to process all customers' calls that are expected to be made at peak periods." The switching module ignores busy season switch and trunk design principles and as a result does not produce sufficient trunks to handle peak volumes on the network.

69. The switching module of the FCC Model does not adhere to accepted industry engineering practices. This causes the Model to be in violation of not only Paragraph 21 of the Order, but also Criterion Eight of the ten criteria which requires that engineering assumptions be reasonable.[49] The module produces line to trunk ratios that far exceed the ratios that are found in telecommunications companies' switches today. The industry engineering standard for line to trunk ratios is approximately 6:1.[50] The switching module of the FCC Model produces a line to trunk ratio of 24:1 for the C&P Company in Maryland. The HAI Model, which is the basis for the FCC switching module, produces line to trunk ratios that range on average from 14:1 to 25:1 in GTE's operating territories. Simply stated, the switch module does not design sufficient trunk facilities to serve the

[49]See First Report and Order at Paragraph 250.

[50]See AT&T's Response to GTE's First Set of Data Requests, Before the Public Service Commission of Missouri, Docket No. TO-98-329, August 28, 1998, Response Nos. 5 and 10 and HAI Model Documentation, Section 6.5.3.1.

existing customer demand. If a company were to engineer its switch so that it had only one trunk for every twenty-five lines, its customers would experience significant blockage when attempting to make interoffice or long distance telephone calls. Similarly, GTE would not be able to meet the service standards dictated by the commissions in the states in which it operates.

70. The excessively high line to trunk ratio found in the switching module is due, in part, to the fact that the module was not developed according to switch engineering design standards. The switching module, as proposed, computes the daily busy hour traffic by dividing the annual Dial Equipment Minutes (DEMs) by the number of business days in a year and the % traffic occurring during the busy hour. It totally disregards the fact that trunk groups are subject to variations in traffic during their busy season. For example, a switch that serves a ski resort area will experience its peak traffic during the winter. Similarly, a switch that serves a beach community will face its peak load in the summer months and have a greatly reduced traffic load in the winter months. The switching module assumes that traffic is distributed evenly across each day of the year (e.g., the switch in the summer resort area would experience severe blockages during the summer). Needless to say, for network design purposes these are unrealistic assumptions that result in an understatement of the trunks produced by the Model.

71. The switching module fails to accurately account for all trunk group types. The module

assumes that all traffic can be consolidated on just seven trunk group types.[51] The module fails to account for announcement trunks and intercept trunks, for example. In addition, it fails to recognize that direct interconnection trunks cannot be combined for different competitive carriers. The module incorrectly assumes that traffic can be aggregated onto trunk groups at the switch level. This is not the case, and results once again in an understatement of trunks being produced by the FCC's switch module.

72. Failure to incorporate trunk modularity principles is another reason why trunks in the FCC model are understated. The FCC model ignores the fact that the trunks are added to a switch in a modular fashion. Basic engineering principles dictate that trunks are added in groups of 24 in a digital switch. In contrast, the switch module calculates trunk requirements to the nearest whole number and then adds that exact amount, thereby ignoring basic trunk engineering principles.

73. The module further understates trunks because it ignores the fact that some of an ILEC's trunking requirements are driven by the demand of Interexchange Carriers (IXCs). IXCs order trunks based on their own forecasts for their demand, not based on DEM counts provided by the ILEC. Recent studies indicate that these forecasts include high levels of spare capacity for the trunk groups ordered. For instance, "MCI and Sprint alone can absorb overnight as much as fifteen percent of AT&T's total 1993 switched

[51] The seven types of trunks contained in the Model are: local direct, local tandem, intraLATA direct, intraLATA tandem, access dedicated, access tandem and operator trunks.

demand at no incremental capacity cost; within 90 days MCI, Sprint, LDDS/Wiltel, using their existing equipment, could absorb almost one-third of AT&T's total switched capacity."[52] It should be noted here that MCI and Sprint combined were roughly one-half of AT&T's size. Clearly, this capacity to absorb large quantities of traffic virtually overnight indicates that IXCs are ordering trunk groups with significant amounts of spare capacity. This fact is not reflected in the network that is designed in the FCC Model.

74. The failure on the part of the Model to build sufficient trunks impacts both the end office and tandem switching and interoffice portions of the network. If trunks are not properly engineered by the Model, both switching and interoffice costs will be understated, and the network built by the Model will not be capable of providing customers uninterrupted telephone service.

75. The FCC staff is going to great length to develop the proposed fixed investment as well as the investment per line inputs for end office switches. If this is the approach that is ultimately used by the Commission in the FCC Model, then the Model need only convert the investment produced by applying the fixed and variable switching investments to the line counts in each end office to monthly cost elements. The Model should not make any additional adjustments to the end office investment calculated. The platform, as it currently exists, reduces switching investment in several instances (e.g., Analog Line

[52]Motion of AT&T Corporation to be Reclassified as a Nondominant Carrier, FCC 95-427, October 15, 1995, Paragraph 59.

Circuit Offset for DLC lines, Trunk Port Cost Reduction). This is inappropriate and causes the Model to produce incorrect switching costs.

76. The Model computes tandem investment, in part, based on the quantity of trunks estimated for each wire center. For reasons discussed above, trunk quantities in the Model are understated. It follows then that the tandem investment is understated. In addition, tandem trunks are required for network traffic originating and terminating on other carriers networks (e.g., from a CLEC network to a wireless network). The quantity of these trunks required is not a function of the DEMs that flow over them, but rather the quantity requested by these carriers. If the methodology contained in the Model is used to size the tandem switches, the tandem network produced will experience blockage.

77. The switch module of the FCC Model platform does not allow the user to input vendor prices separately to reflect the different getting started and per line costs that are charged by different vendors. The failure on the part of the Model to allow this does not comply with the directives set forth by the Commission in Criterion Three. This Criterion requires that the model "must be based upon an examination of the current cost of purchasing facilities and equipment."[53] If the platform only allows a singular input for getting started costs and a singular input for per line costs, it will not be able to reflect the current costs charged by different vendors to purchase facilities.

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[53] See Report and Order at Paragraph 250.

78. In Paragraph 11 of the Fifth Report and Order, the Commission states that, "to estimate forward-looking costs accurately, the Commission decided to look at all of the costs and cost-causative factors that go into building a network." Similarly, Criterion Two of the ten criteria requires that, "[a]ny network function or element, such as loop, switching, transport, signaling necessary to produce supported services must have an associated cost."[54] The FCC Model does not comply with these directives. The Model fails to provide any investment for the Operation Support Systems (OSS) critical to providing services in a wholesale and retail environment. In addition, the Model does not include any investment for the testing facilities required to provision and maintain telecommunications services. These are fundamental functions, without which, ILECs would not be able to provide service to their customers (both wholesale and retail). Therefore, these functions must be considered platform items and must be included before the FCC Model can be meaningfully evaluated.

79. The Model also violates the dictates of Paragraph 11 of the Order and Criterion Two because it excludes the capitalized labor costs associated with trunk installation. The installation of switched DS0 level trunks requires circuit design, central office translations, and initial testing prior to turn-up of trunks. The labor associated with the activities is capitalized labor that should be included as part of the trunking investment. This investment is not included in the FCC Model.

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[54] Id.

80. Paragraph 11 of the Order and Criterion Two are further violated by the FCC Model because the Model does not include the costs associated with some necessary SS7 signaling links. The approach used by the Model to size the ILEC Signal Transfer Points (STP) inappropriately excludes certain interLATA links, thereby understating STP investment. This results in a unit cost understatement because the Model then develops a per unit cost for signaling that includes the traffic that flows over the links that it excluded.[55]

81. Criterion Eight of the ten criteria mandates that, "[t]he cost study or model and all underlying formulae, computer software associated with the Model should be available to all interested parties for review and comment."[56] In the Second Recommended Decision of the Joint Board, it states that "a model must meet the openness criterion required of all model developers. At present, the federal platform has been tested using geocoded customer location data that is treated as proprietary information by its supplier."[57] The geocode data is still not available to the interested parties in this proceeding, and therefore the Model does not meet the "openness" criterion espoused by the Joint Board and by Criterion Eight.

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[55]See Hatfield Inputs Portfolio (HIPS), Section 4.

[56]Id.

[57]See Second Recommended Decision, Before the Federal Communications Commission, CC Docket No. 96-45, Released November 23, 1998, Paragraph 29.

82. The Second Recommended Decision also states that, "without a complete forward-looking economic cost model, it is not possible for the Joint Board to make a final recommendation as to the most reasonable forward-looking methodology to be used in distributing federal high cost support to the states and/or carriers."[58] As demonstrated above, the Model is not complete and in its present state is not capable of being evaluated or validated. The incompleteness of the Model also violates the requirement of Criterion Nine that, "[t]he cost model should include the capability to examine and modify the critical assumptions and engineering principles.[59]

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 17, 1998.

Francis J. Murphy

Subscribed and sworn before me this 17th day of December, 1998.

Notary Public

My Commission Expires: June 4, 2004

[58] Id., Paragraph 28.

[59] See Report and Order at Paragraph 250.